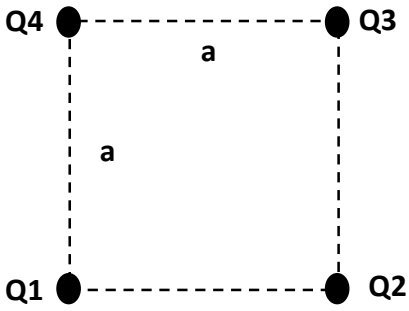
Exercise 01

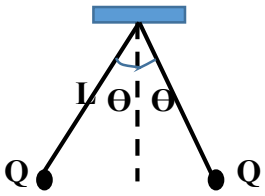
Four charges Q_1, Q_2, Q_3, and Q_4 are arranged as shown in the opposite figure.



1) Represent on the figure the electric forces applied to the electric charge Q_3
2) Write the analytical expression for each electric force acting on the electric charge Q_3
3) Calculate the net force applied to charge Q_3. ($Q_1 = Q_2 = Q_3 =$ 1 µC, $Q_4 = 2\mu C$)

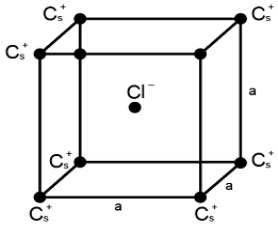
Exercise 02

Two tiny conducting balls of identical mass m and identical charge q hang from non-conducting threads of length L. Assume that θ is so small that tan θ can be replaced by sin θ; show that, for equilibrium: $X = (q^2 L/mg2\pi\varepsilon_0)^{1/3}$



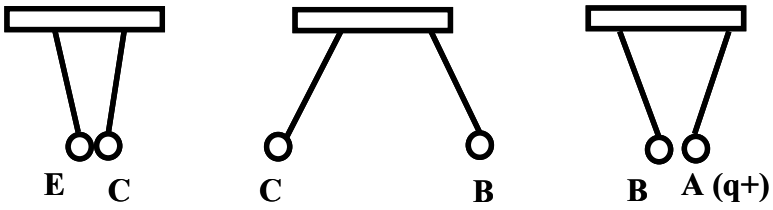
Exercise 03

In the basic CsCl (Cesium chloride) crystal, Cs+ ions form the corners of a cube and a Cl- ion is
at the centre of cube. Edge length is 0.40 nm.
(a) What is the magnitude of the net electrostatic force exerted on Cl- ion by the eight Cs+ ions?



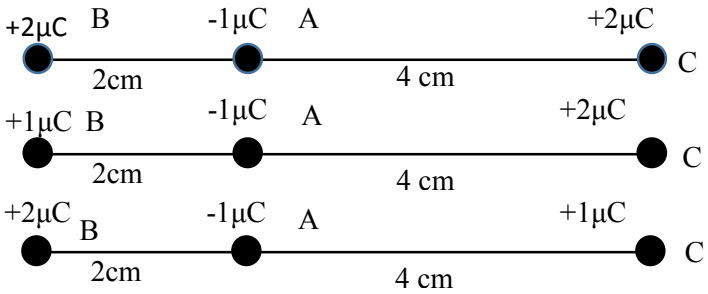
Exercise 04

What is the nature of the electrical charges carried by the balls shown in the figure?



Exercise 05

1) What is the net force on charge A in each configuration shown in the opposite picture?



2) We want to put the charge $q_a = -1\ \mu C$ between two charges q_c *and* q_b (on the line joining the two charges as shown figure below) where the applied force from $q_b = +1\mu C$ charge on the charge q_a is cancelled by the force from the charge $q_c = +2\ \mu C$ charge. Since forces are vectors,. We will assume that the 1 µC charge is some distance x from the +1µC. Calculate the distance x between q_a *and* q_b